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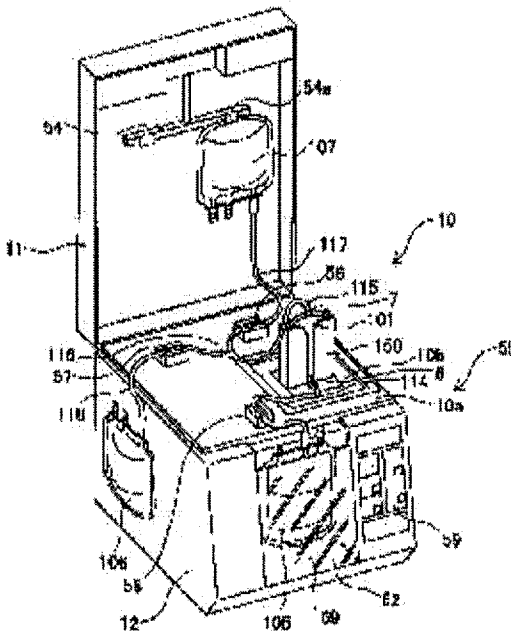
(54) BLOOD COMPONENT SEPARATING DEVICE AND BLOOD COMPONENT SEPARATING METHOD

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a blood component separating method which is good in workability in separating red blood cells, short in filtration time and high in red blood cell recovery rate and is high in white blood cell removal rate, and a blood component separating device used for the same.

SOLUTION: The blood component separating device 10 is used for a blood component collection circuit 100 having a bag 105 for total blood component collection, a bag 106 for blood plasma collection, a bag 107 for red blood cell liquid collection and a white blood cell removing filter 101. The blood component separating device has a thrusting mechanism for thrusting the bag 105 for total blood collection housing the total blood separated to a blood plasma layer of an upper layer and a blood cell layer of a lower layer and discharging the housed blood component and a filter stand 150 for holding the white blood cell removing filter at a nearly perpendicular state.



NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

Claim(s)]
Claim 1]A constituent-of-blood segregating unit comprising:
A bag for whole blood blood collecting.
A bag for plasma extraction.
A bag for red corpuscle liquid extraction.
Are a leukocyte removal filter a constituent-of-blood segregating unit used for a constituent-of-blood extractior circuit which it has at least, and this constituent-of-blood segregating unit, A pressing mechanism for pressing a bag for whole blood blood collecting which accommodated whole blood divided into the upper plasma layer and a lower layer blood cell layer, and discharging a stored constituent of blood, a filter stand which holds a leukocyte removal filter to a perpendicular state mostly, and this filter stand applied part.

Claim 2]Said stand is provided with a body part for storing said leukocyte removal filter, and this body part, The constituent-of-blood segregating unit according to claim 1 from which an interval of a plate-like portion with which it has a plate-like portion which contacts a leukocyte removal filter at the time of use, which was formed almost in parallel, and which faces each other, and which this body part faces has become more than the thickness of said leukocyte removal filter.
Claim 3]The constituent-of-blood segregating unit according to claim 1 or 2 which is that by which said filter stand applied part is equipped with said stand removable.
Claim 4]The constituent-of-blood segregating unit according to any one of claims 1 to 3 which said apheresis system equips with the 1st hanging portion located up from a bag for whole blood blood collecting and a filter stand applied part which are pressed by said pressing mechanism at the time of use.
Claim 5]The constituent-of-blood segregating unit according to any one of claims 1 to 4 which said apheresis system equips with the 1st hanging portion and 2nd hanging portion that are located up from a bag for whole blood blood collecting and a filter stand applied part which are pressed by said pressing mechanism at the time of use.
Claim 6]The constituent-of-blood segregating unit according to any one of claims 1 to 5 is used, A constituent-of-blood extraction circuit, or a bag for whole blood blood collecting, a bag for plasma extraction, a leukocyte removal filter and a bag for red corpuscle liquid extraction which are provided with a bag for red

corpuscle liquid extraction in which it filled up with a bag for whole blood blood collecting, a bag for plasma extraction, a leukocyte removal filter, and red corpuscle conservation liquid at least. And it is a constituent-of-blood extraction circuit provided with a red corpuscle conservation liquid restoration bag at least, And are a constituent-of-blood separation method performed by equipping with a constituent-of-blood extraction circuit in the state where whole blood divided into the upper plasma layer and a lower layer blood cell layer was accommodated in a bag for whole blood blood collecting, and said bag for whole blood blood collecting, A bag for red corpuscle liquid extraction or a red corpuscle conservation liquid restoration bag in which it filled up with said red corpuscle conservation liquid so that it may become a lower part from said stand, A constituent-of-blood separation method pouring in red corpuscle conservation liquid to said bag for whole blood blood collecting in the state where it has arranged so that it may become the upper part from said stand.

Claim 7]The constituent-of-blood segregating unit according to any one of claims 1 to 5 is used, A constituent-of-blood extraction circuit, or a bag for whole blood blood collecting, a bag for plasma extraction, a leukocyte removal filter and a bag for red corpuscle liquid extraction which are provided with a bag for red corpuscle liquid extraction in which it filled up with a bag for whole blood blood collecting, a bag for plasma extraction, a leukocyte removal filter, and red corpuscle conservation liquid at least. And it is a constituent-of-blood extraction circuit provided with a red corpuscle conservation liquid restoration bag at least, And it is a constituent-of-blood separation method performed by equipping with a constituent-of-blood extraction circuit in the state where whole blood divided into the upper plasma layer and a lower layer blood cell layer was accommodated in a bag for whole blood blood collecting, A constituent-of-blood separation method provided with a process into which a fluid which flows into said leukocyte removal filter first is made to flow from the lower part of a leukocyte removal filter in the state where it was stored almost vertically in said stand.

Claim 8]A bag for red corpuscle liquid extraction or a red corpuscle conservation liquid restoration bag in which it filled up with said red corpuscle conservation liquid so that said bag for whole blood blood collecting may serve as a lower part from said stand, The constituent-of-blood separation method according to claim 7 which is what pours in red corpuscle conservation liquid to said bag for whole blood blood collecting in the state where it has arranged so that it may become the upper part from said stand.

Translation done.]

MEANS

[Means for Solving the Problem]What attains the above-mentioned purpose A bag for whole blood blood collecting, and a bag for plasma extraction, Are a bag for red corpuscle liquid extraction, and a leukocyte removal filter a constituent-of-blood segregating unit used for a constituent-of-blood extraction circuit which it has at least, and this constituent-of-blood segregating unit, A pressing mechanism for pressing a bag for whole blood blood collecting which accommodated whole blood divided into the upper plasma layer and a lower layer blood cell layer, and discharging a stored constituent of blood, They are a filter stand which holds a leukocyte removal filter to a perpendicular state mostly, and a constituent-of-blood segregating unit provided with this filter stand applied part.

[0005]And said stand is provided with a body part for storing said leukocyte removal filter, and this body part, As for an interval of a plate-like portion with which it has a plate-like portion which contacts a leukocyte removal filter at the time of use, which was formed almost in parallel, and which faces each other and which this body part faces, it is preferred to have become more than the thickness of said leukocyte removal filter. As for said stand, it is preferred that it is that with which said filter stand applied part is equipped removable. As for said apheresis system, it is more preferred than a bag for whole blood blood collecting and a filter stand applied part which are pressed by said pressing mechanism at the time of use to have the 1st hanging portion (if it puts in another way hanging portion for bags for red corpuscle liquid extraction) located up. The 1st hanging portion in which said apheresis system is located up from a bag for whole blood blood collecting and a filter stand applied part which are pressed by said pressing mechanism at the time of use (in other words.) It is preferred to have a hanging portion for bags for red corpuscle liquid extraction and the 2nd hanging portion (if it puts in another way hanging portion for bags for plasma extraction after plasma extraction).

[0006]A constituent-of-blood separation method of this invention uses a constituent-of-blood segregating unit of a statement for above either, A constituent-of-blood extraction circuit, or a bag for whole blood blood collecting, a bag for plasma extraction, a leukocyte removal filter and a bag for red corpuscle liquid extraction which are provided with a bag for red corpuscle liquid extraction in which it filled up with a bag for whole blood blood collecting, a bag for plasma extraction, a leukocyte removal filter, and red corpuscle conservation liquid at least. And it is a constituent-of-blood extraction circuit provided with a red corpuscle conservation liquid restoration bag at least, And are a constituent-of-blood separation method performed by equipping with a constituent-of-blood extraction circuit in the state where whole blood divided into the upper plasma layer and a lower layer blood cell layer was accommodated in a bag for whole blood blood collecting, and said bag for whole blood blood collecting, A bag for red corpuscle liquid extraction or a red corpuscle conservation liquid restoration bag in which it filled up with said red corpuscle conservation liquid pours in red corpuscle conservation liquid to said bag for whole blood blood collecting in the state where it has arranged so that it may become the upper part from said stand so that it may become a lower part from said stand.

[0007]A constituent-of-blood separation method of this invention uses a constituent-of-blood segregating unit of a statement for above either, A constituent-of-blood extraction circuit, or a bag for whole blood blood collecting, a bag for plasma extraction, a leukocyte removal filter and a bag for red corpuscle liquid extraction

which are provided with a bag for red corpuscle liquid extraction in which it filled up with a bag for whole blood blood collecting, a bag for plasma extraction, a leukocyte removal filter, and red corpuscle conservation liquid at least. And it is a constituent-of-blood extraction circuit provided with a red corpuscle conservation liquid restoration bag at least, And it is a constituent-of-blood separation method performed by equipping with a constituent-of-blood extraction circuit in the state where whole blood divided into the upper plasma layer and a lower layer blood cell layer was accommodated in a bag for whole blood blood collecting, It has a process into which a fluid which flows into said leukocyte removal filter first is made to flow from the lower part of a leukocyte removal filter in the state where it was stored almost vertically in said stand.

[0008]And a bag for red corpuscle liquid extraction or a red corpuscle conservation liquid restoration bag in which it filled up with said red corpuscle conservation liquid so that said bag for whole blood blood collecting might serve as a lower part from said stand, It is preferred that it is what pours in red corpuscle conservation liquid to said bag for whole blood blood collecting in the state where it has arranged so that it may become the upper part from said stand.

[0009]

[Embodiment of the Invention]The apheresis system 10 of this invention is explained using the example to illustrate. The apheresis system 10 of this invention is a constituent-of-blood segregating unit used for the bag 10 for whole blood blood collecting, the bag 106 for plasma extraction, the bag 107 for red corpuscle liquid extraction, and the constituent-of-blood extraction circuit provided with the leukocyte removal filter 101 at least. The pressing mechanism for a constituent-of-blood segregating unit pressing the bag 105 for whole blood blood collecting which accommodated the whole blood divided into the upper plasma layer and the lower layer blood cell layer, and discharging the stored constituent of blood, It has the filter stand 150 which holds both leukocyte removal filters to a perpendicular state mostly as if laid in the upper surface flat part 10a and the upper surface flat part 10a. As shown in drawing 1, the apheresis system 10 is equipped with the constituent-of-blood extraction circuit 100.

[0010]As shown in drawing 1, drawing 2, and drawing 5, the apheresis system 10 of this invention, The 2nd tabular member 63 that forms the stowage 69 of the bag 105 for whole blood blood collecting in which the whole blood which centrifugality was carried out between the 1st tabular member 62 and the 1st tabular member 62, and was divided into the upper plasma layer and the lower layer blood cell layer was accommodated, It has a pressing mechanism which consists of a pressing means which presses the 2nd tabular member 63 in the 1st tabular member 62 direction. As shown in drawing 3, the hard stand 150 for leukocyte removal filters usable to the leukocyte removal filter of the type of both an elasticity housing type and a hard housing type, It has the body part 152 for storing the leukocyte removal filter 101, and the body part 152 is provided with the plate-like portions 152a and 152b which contact the leukocyte removal filter 101 at the time of use, which were formed almost in parallel and which face each other. The interval of the plate-like portions 152a and 152b which the body part 152 faces has become more than the thickness of the leukocyte removal filter 101.

[0011]The apheresis system 10 is provided with the following.

Housing 10.

Lid 11.

And the housing 10 is provided with the liquid separation device 55 for separating the plasma layer in the bag 105 for whole blood blood collecting, and a blood cell layer, and the hard stand 150 for leukocyte removal filters. As shown in drawing 5, beforehand the liquid separation device 55 between the 1st tabular member 62 and the 1st tabular member 62 A plasma layer (upper layer), It has the pressing mechanism which presses the 2nd tabular member 63 that forms the stowage 69 of the bag 105 for whole blood blood collecting in which the fluid divided into the blood cell layer (lower layer) was accommodated, and the 2nd tabular member 63 in the tabular member 62 direction of the 1st. And the spring member 65 by which the pressing mechanism was established between the pressing member 64, and the pressing member 64 and the 2nd tabular member 63, It has the shaft member 67 which was inserted in in the spring member 65 and inserted in movable in the pressing member 64, and the actuator 66 which drives the pressing member 64 in the 2nd tabular member 63 direction, and it is constituted so that press of the 2nd tabular member 63 may be performed via the spring member 65. The pressing mechanism has a function which presses the 2nd tabular member 63 automatically, decreases gradually further the thrust after the state where the fluid (plasma constituent) of the upper layer in the bag 105 for whole blood blood collecting flows out, and presses the 2nd tabular member 63.

[0012]The pars basilaris ossis occipitalis is supported pivotally by the front face of the housing 10, and the 1st tabular member 62 has become rotatable from the position shown in drawing 5 with a dashed line at the position shown as a solid line, and after it stores the bag 105 for whole blood blood collecting, specifically, it is fixed in the position shown as a solid line. And the 2nd tabular member 63 is the back of the 1st tabular member 62, and the upper bed part is supported pivotally near the front face of the housing 10, and it is rotatable in 1st tabular member 62 direction. As the 1st and 2nd tabular members, that it is a plate member may be curving moderately preferably. The actuator 66 is constituted by the motor 76 which is a driving source, and the transmission part 74 which transmits rotation of this motor 76 to the axis of rotation 72. And the pressing member 64 moves in the 2nd tabular member 63 direction by rotation of this axis of rotation 72. The axis 67 is inserted in the pressing member 64 movable, and the spring member 65 is formed in the axis 67 further located between the pressing member 64 and the 2nd tabular member 63. Therefore, when the pressing member 64 moves, the back end of the spring member 65 is pushed, and the tip of the spring member 65 is constituted so that it may be compressed by between the pressing member 64 and the 2nd tabular member 63, while pressing the 2nd tabular member 63. As for the spring member 65, it is preferred that the axis 67 also moves with that movement, and for this reason, the spring member 65 has inserted in the axis 67 so that there may be no slack not much. If the spring member 65 does not curve, it is not necessary to establish the axis 67.

[0013]Next, an operation of this liquid separation device 55 is explained using drawing 5 thru/or drawing 7. Drawing 5 shows the state where the bag 105 for whole blood blood collecting centrifuged by the liquid separation device 55 was attached. And while the pressing member 64 moves in the 2nd tabular member 63 direction as by operating the actuator 66 shows to drawing 6, and the spring member 65 presses the 2nd tabular member 63, the spring member 65 is compressed to be shown in drawing 6. And the drive of the actuator 66 stops, when the pressing member 64 reaches the position set up beforehand. The setting-out position is a position to which the fluid in the bag 105 for whole blood blood collecting results in the state (state where the bag 105 for whole blood blood collecting was pressed by the 1st tabular member 62 and the

2nd tabular member 63) of flowing out from the tube 114 at least. It is set as the position which will usually specifically be in the state where about (it is about 45% of the whole liquid quantity if the percentage of the upper fluid is 50%) 90% of the fluids of the upper layer in 105 for whole blood blood collecting flowed out. Drawing 6 shows the state where the actuator 66 stopped. Then, the spring member 65 compressed by the 2nd tabular member 63 and the pressing member 64 to be shown in drawing 7, The 2nd tabular member 63 is pressed according to the stability, and the stability can make the fluid of the upper layer in 105 for whole blood blood collecting flow out from the tube 114, without disturbing the interface of the fluid of the upper layer in 105 for whole blood blood collecting, and a lower layer fluid, since it becomes weak gradually. Thus, by having constituted so that the 2nd tabular member 63 might be pressed using the spring member 65, In order to decrease gradually the thrust after the state where the fluid of the upper layer of the bag 105 for whole blood blood collecting flows out and to press the 2nd tabular member 63, The fluid of the upper layer in the bag 105 for whole blood blood collecting can be made to flow out from the tube 114, without disturbing the interface of the fluid of the upper layer in the bag 105 for whole blood blood collecting, and a lower layer fluid. And the fluid detection part 71 (lower layer fluid detection part) is formed in the upper part of the 2nd tabular member 63, when a lower layer fluid is detected by the fluid detection part, the occlusion part 58 which blockades the tube 114 operates, and the separation work of a fluid is completed. The fluid detection part 71 is for detecting the interface of a plasma layer and a blood cell layer in this invention. And as the fluid detection part 71, photosensor etc. are used and this can detect an interface according to the difference of a light absorption rate or light transmittance, and also the rate of a light reflex, for example. As an actuator which drives the pressing member 64, not only the above motors but an air cylinder and an oil hydraulic cylinder may be used. Thus, in the liquid separation device 55 of this invention, since the automatic thing is used as a driving means, there is no necessity for complicated manual operation, and the upper fluid can be extracted easily. In the liquid separation device 55, as shown in drawing 5 thru/or drawing 7, in the state where the 1st tabular member 62 is in the position of a solid line, the upper bed part serves as an upper bed part of the 1st tabular member 62, and an approaching position, and the 2nd tabular member 63 is being fixed in the position. And the 2nd tabular member 63 is supported pivotally in the upper bed part, and is rotatable in 1st tabular member 62 direction. For this reason, the bag 105 for whole blood blood collecting will be pressurized by rotation of the 2nd tabular member 63 at the lower end part side from the upper bed part side of the bag 105 for whole blood blood collecting. And as rotation of the 2nd tabular member 63 progresses, and shown in drawing 7, the distance by the side of the upper part of the 1st tabular member 62 and the 2nd tabular member 63 becomes near, and the quantity in which the fluid of the upper layer separated in the bag 105 for whole blood blood collecting remains in the upper part in the bag 105 for whole blood blood collecting will become [few / very].

[0014]And in the liquid separation device 55, since it is constituted as mentioned above, the upper part has stuck the bag 105 for whole blood blood collecting to both between the 1st tabular member 62 and the 2nd tabular member 63. For this reason, the portion which does not contact the 2nd tabular member 63 is not formed in the upper bed part of the bag 105 for whole blood blood collecting. Therefore, it becomes possible to detect the interface of the fluid of the upper layer separated in the bag 105 for whole blood blood collecting, and a lower layer fluid in the upper part of the bag 105 for whole blood blood collecting. In the state where it

was pressed by the 1st tabular member 62 and the 2nd tabular member 63, the bag 105 for whole blood blood collecting has little quantity in which the upper fluid in which it was separated in the bag 105 for whole blood blood collecting since the upper part was in the flat state remains in the upper part in the bag 105 for whole blood blood collecting. Therefore, the extraction efficiency of the upper fluid is high. Since the bag 105 for whole blood blood collecting does not rise, setting out of the automatic detection position of an interface is easy.

[0015]The hard stand 150 for leukocyte removal filters, As shown in drawing 1 and drawing 3, have the body part 152 for storing the leukocyte removal filter 101, and the body part 152, Having the plate-like portions 152a and 152b which contact the leukocyte removal filter 101 at the time of use, which were formed almost in parallel and which face each other, the interval of the plate-like portions 152a and 152b which the body part 152 faces has become more than the thickness of the leukocyte removal filter 101.

[0016]The hard stand 150 is provided with the following.

The opening 153 for leukocyte removal filter insertion provided in the upper bed of the body part 152.

The stand base material 156 installed in the upper surface flat part 10b by that cause while being provided in the lower end of the body part 152 and supporting the body part 152 almost vertically.

the blood inflow port 6 of the leukocyte removal filter 101 -- the notch 154 for derivation for deriving the tubes 114 and 115 connected to the ****** outflow port 7 from the opening 153 for insertion to the lower end side of the body part 152.

[0017]The body part 152 is a portion for storing saccate housing 2 portion of the leukocyte removal filter 101 inside, and length, width, and thickness are formed more greatly than saccate housing 2 portion. For this reason, the hard stand 150 can store the leukocyte removal filter 101, without pressing the saccate housing 2, while being able to store the whole housing 2 portion. Since the internal shape of the hard stand 150 is produced by the almost same shape as the outer diameter of the saccate housing 2, the leukocyte removal filter 101 hardly moves within the hard stand 150 after wearing.

[0018]The plate-like portion 152a to which the body part 152 contacts both sides of the housing 2 of the leukocyte removal filter 101 at the time of use (at the time of blood inflow), which was formed almost in parallel and which faces each other, Having 152b, as for the interval of the plate-like portions 152a and 152b, more than the thickness at the time of the non-blood inflow of the leukocyte removal filter 101 (natural state) serves as a grade large concrete a little. Even if the leukocyte removal filter 101 is equipped with the hard stand 150, the thermoplastic sheet 21 made of elasticity resin and the filter member 5 for leukopheresis of a leukocyte removal filter do not stick, and circulation of the filtration materials (blood) which flowed into leukocyte removal filter 101 inside is not barred. That is, by using this hard stand 150, at the time of blood inflow, the leukocyte removal filter 101 can be changed into a state near at the time of non-blood inflow (a natural state, an unused state), and leukopheresis can be performed in the state near morphology of design.

[0019]Without crushing a hole, even if it is a case where the filter member for leukopheresis is produced by a porous body if the interval of the plate-like portions 152a and 152b is produced as mentioned above, since a leukocyte removal filter can be stored in a hard stand, filtration can be ensured. The filtration velocity of the leukocyte removal filter 101 can be adjusted by adjusting the interval of the plate-like portions 152a and 152b

which the hard stand 150 faces. The inside of the body part 152 is not what is restricted to above-mentioned composition, A leukocyte removal filter cannot be pressed from the exterior at the time of use, and as long as the interval of the plate-like portion which a hard stand faces is more than the thickness of a leukocyte removal filter, it may be produced by what kind of shape and size.

[0020]The size inside the body part 152 of the hard stand 150, The interval of the plate-like portions 152a and 152b which face each other receives the thickness of a leukocyte removal filter, It is preferred that the length of the direction to which the longitudinal direction of the increase of 0-3 mm and drawing 3 and the length of the longitudinal direction of the increase of 0-3 mm and drawing 3 cross at right angles to the length of a leukocyte removal filter is increase of 0-3 mm to the width of a leukocyte removal filter. When the opening 153 for insertion equips the hard stand 150 with the leukocyte removal filter 101, it is a portion which inserts the filter 101. And since the cross-section area of the direction which intersects perpendicularly with the longitudinal direction of drawing 3 of the opening 153 for insertion is produced more greatly than the cross-section area of the A-A line section (drawing 14) of drawing 12 of a leukocyte removal filter, it can insert the leukocyte removal filter 101 easily from the hard stand 150 upper part. It may produce so that the leukocyte removal filter 101 can be inserted easily and the diameter of the opening 153 neighborhood may be expanded to tapered shape toward an upper bed.

[0021]In the example shown in drawing 3, the notch 154 for derivation is formed only in the single-sided side of the body part 152 so that it may become straight line shape from the opening 153 at the lower end side. And although formed in the width almost same up to near the opening 153 bottom from the lower end part, the notch 154 for derivation is produced so that the diameter may be expanded from near the opening 153 bottom to tapered shape toward the opening 153. The notch 154 for derivation may be bent not only by a straight line shape thing but by the middle from an opening to a lower end part. And the notch 154 for derivation after tube derivation, Since it is a portion which the tubes 114 and 115 connected to the blood inflow port 6 or the blood outflow port 7 pass, a blood cell layer can be made to flow in the leukocyte removal filter 101 also in the state where it equipped with the hard stand 150.

[0022]As for the width of the notch 154 for derivation, it is preferred to produce to the outer diameter of the tubes 114 and 115 connected to the blood inflow port 6 or the blood outflow port 7 in size of -1 mm or more and less than +10 mm. -Having been referred to as 1 mm could advance to the lower end side with the flexibility of the tube, even if it produced some narrowly from the outer diameter of the tube, and having been referred to as less than 10 mm to the outer diameter of a tube, It is because capacity regulation of a leukocyte removal filter cannot be appropriately performed if it produces greatly not less than 10 mm to the outer diameter of a tube.

[0023]By attaching the undersurface of the stand base material 156 to the hard stand fitting part 10b formed in the upper surface flat part 10a of the housing 10, the hard stand 150 is installed so that it may become almost vertical to the upper surface flat part 10a. The hard stand 150 is installed in the hard stand fitting part 10b dismountable. The base material 156 has the tube storage slot 157 which stores the tubes 114 and 115 connected to the blood inflow port 6 or the blood outflow port 7 after leukocyte removal filter 101 storage. At the time of leukocyte removal filter 101 storage, the tube 114 connected to the port to which it comes for the leukocyte removal filter 101 bottom as shown in drawing 1 bent in contact with the undersurface of a stand,

and has come outside through the tube storage slot 157. Then, when the tube connected to the port to which it comes for the bottom by the above-mentioned composition is stored by the tube storage slot 157 in near a port and bends gently, it does not become a tube kink and the inflow of blood is not barred. The stand fitting part 10b may be provided with the weight sensor.

[0024]As for the thickness of the hard stand 150, it is preferred that almost all portions are not less than 2 mm. This is because a hard stand can extend by extension of a leukocyte removal filter and capacity regulation cannot be suitably performed, if thickness is thin even if it is the container produced with rigid resin. It is with most because some hard stands 150 can attain the above-mentioned purpose at least less than 2 mm. As a formation material of a hard stand, although polypropylene, rigid polyvinyl chloride, polystyrene, polyethylene, etc. are used, it is polypropylene more preferably. As for the thickness of a hard stand, 2-3 mm in the range of not less than 2 mm is more preferred. As for the hard stand 150, it is preferred that transparency is produced with high resin. It can be checked by this in what kind of state filtration materials are circulating, and when filtration materials are got blocked, it can be coped with quickly. As high resin of transparency, polyolefin system resin, such as styrene resin, such as polystyrene and a styrene butylene copolymer, polycarbonate, polypropylene, and polyethylene, etc. are used. As long as it can check the state in a leukocyte removal filter, it may be produced with resin that it does not need to be completely transparent and translucent. The notches 164 and 165 for tube derivation may be formed in the both side surfaces of the body part 162 like the hard stand 160 which shows drawing 4 a hard stand. The hard stand 160 is the same as the hard stand 150 except the notches 164 and 165 for tube derivation being formed in the both side surfaces of the body part 162.

[0025]As shown in drawing 1, the navigational panel 59 which has an electric power switch, various switches, etc. is formed in the front face of the housing 10. By setting using this navigational panel 59, separation of the constituent of blood mentioned above is performed automatically. As shown in drawing 1, the clamps 56, 57, and 58 which can open and close the channel of the tubes 114, 117, and 118 are formed in the upper surface flat part 10a of the housing 10. The clamps 56, 57, and 58 open and close the channel of the tubes 114, 117, and 118 by the solenoid attached to each.

[0026]As shown in drawing 1, the end is attached to the housing 10 rotatable, and the lid 11 can stand up almost vertically to the upper surface flat part 10a. Inside the lid 11, the jig 54 for immobilization for hanging the bag 106 for plasma extraction and the bag 107 for red corpuscle liquid extraction is attached. In the jig 54 for immobilization, two hooks 54a are formed in both ends, one hook constitutes the 1st hanging portion (bag hanging portion for red corpuscle liquid extraction), and the hook of another side constitutes the 2nd hanging portion (hanging portion for bags for plasma extraction after plasma extraction). The bag 106 for plasma extraction and the bag 107 for red corpuscle liquid extraction are hung by hooking the openings 113 and 119 for hanging on the hook of one of these.The jig 54 for immobilization may be what can adjust the height from the upper surface flat part 10a.

[0027]Next, the blood separation method of this invention is explained. Drawing 8 is an outline view of the constituent-of-blood extraction circuit used for the constituent-of-blood separation method of the example of this invention. The constituent-of-blood extraction circuit 100 is provided with the following.

The bag 105 for whole blood blood collecting.

The bag 106 for plasma extraction.
The bag 107 for red corpuscle liquid extraction.
It has the tee 116 which branched to two forks while the end was connected to the bag 105 for whole blood blood collecting, And the connecting tube 102 by which the branched one end was connected to the bag 106 for plasma extraction, and the branched another side end was connected to the bag 107 for red corpuscle liquid extraction and the leukocyte removal filter 101 arranged between the tee 116 of the connecting tube 102, and the bag 105 for whole blood blood collecting.
And the connecting tube 102 consists of the tubes 114, 115, 117, and 118 and the tee 116. And as shown in drawing 1, the apheresis system 10 mentioned later is equipped with the constituent-of-blood extraction circuit 100 mentioned above, for example, and it is used for extraction of a constituent of blood. As an apheresis system, it is not limited to this example.
[0028]Next, about the constituent-of-blood separation method performed using the constituent-of-blood extraction circuit 100 mentioned above, the case where the apheresis system 10 is used is explained as an example. The constituent-of-blood extraction circuit 100 provided with the bag 107 for red corpuscle liquid extraction in which the above-mentioned constituent-of-blood segregating unit 10 was filled up with the bag 105 for whole blood blood collecting, the bag 106 for plasma extraction, the leukocyte removal filter 101, and red corpuscle conservation liquid at least is used for the constituent-of-blood separation method of this invention, And it is a constituent-of-blood separation method performed by equipping with the constituent-of-blood extraction circuit 100 in the state where the whole blood divided into the upper plasma layer and the lower layer blood cell layer was accommodated in the bag 105 for whole blood blood collecting. The constituent-of-blood separation method of this invention the bag 105 for whole blood blood collecting, So that it may become a lower part from the filter 101 (filter specifically held at the stand), The bag 107 for red corpuscle liquid extraction or the red corpuscle conservation liquid restoration bag (not shown) mentioned above in which it filled up with red corpuscle conservation liquid performs constituent-of-blood separation in the state where it has arranged so that it may become the upper part from the filter 101 (filter specifically held at the stand).
[0029]The constituent-of-blood separation method of this invention is provided with the process into which the fluid which flows into a leukocyte removal filter first is made to flow from the lower part of the leukocyte removal filter in the state where it was stored almost vertically in a stand. As a constituent-of-blood extraction circuit, it may have the bag 105 for whole blood blood collecting, the bag 106 for plasma extraction, the leukocyte removal filter 101, the bag 107 for red corpuscle liquid extraction, and a red corpuscle conservation liquid restoration bag (not shown) at least.
[0030]The constituent-of-blood separation method of this invention is explained concretely. First, the blood collecting means 104 is used into the bag 105 for whole blood blood collecting, and whole blood is extracted. And using a tube sealer, after blood collecting carries out the seal of near the origin of the tube 109, and separates the blood collecting means 104.
[0031]Next, the process of installing the constituent-of-blood extraction circuit 100 in a centrifuge, and carrying out centrifugality is performed. The whole blood in the bag 105 for whole blood blood collecting by which centrifugality was carried out consists of a plasma layer which mainly becomes the upper part of the

bag 105 from plasma, and an erythrocyte layer which mainly becomes the bag 105 lower part from red corpuscles. It is based on a top plasma layer at a centrifugal grade, and leucocytes and red corpuscles are mixing and leucocytes are usually mixed also in an erythrocyte layer. And in the origin red corpuscles of a 400-ml blood collecting bag, if leucocytes exist in more than an nx10 ^{6} individual, they will trigger an antibody production reaction and are not preferred.

[0032]Next, the leukocyte-poor plasma extraction process of passing the leukocyte removal filter 101 and extracting the plasma layer separated in the bag 105 for whole blood blood collecting by the centrifugal process in the bag 106 for plasma extraction is performed. As shown in drawing 1, where the blood outflow port 7 side is caudad made into the upper part for the blood inflow port 6 side, the leukocyte removal filter 101 is stored to the hard stand 150, The bag 105 for whole blood blood collecting is stored to the stowage 69 of the liquid separation device 55 in which it was provided by the position lower than the leukocyte removal filter 101, The bag 106 for plasma extraction is installed in a position lower than the leukocyte removal filter 101, and the bag 107 for red corpuscle extraction is hung in a position higher than the leukocyte removal filter 101 using the hook 54a of the jig 54 for immobilization in which it was provided by the lid 11. The tubes 114, 117, and 118 are being fixed to the clamps 56, 57, and 58 as shown in drawing 1.

[0033]In this state, if the separation start switch of the apheresis system 10 is pushed, the clamps 56, 57, and 58 will close by a solenoid, and the tubes 114, 117, and 118 will be in a state of obstruction. In this stage, the communicating member 110 which is provided in the tube 114 and which can be fractured, and the communicating member 111 which is provided in the tube 117 and which can be fractured are fractured. And again, if the separation start switch of the apheresis system 10 is pushed, the tubes 114 and 118 will be in an opened condition by a solenoid, a pressing mechanism will press the bag 105 for whole blood blood collecting, and the plasma layer in the upper part in the bag 105 for whole blood blood collecting will be sent out to the bag 106 for plasma extraction. On the occasion of this plasma transfer, the air in the filter 101 flows certainly in the bag 106 for plasma extraction in advance of movement of plasma. For this reason, priming which is substitution of the air in a filter and a fluid is performed certainly. And plasma flows into the bag 106 for plasma extraction, after passing the leukocyte removal filter 101 and filtering leucocytes. And when the interface of the plasma layer in a container and a blood cell layer goes up gradually and the fluid detection part 71 detects the interface of corpuscle liquid, the clamp 58 closes and the tube 114 is blockaded, as pressure is continued. When the tube 114 is blockaded, although plasma remains to the entrance side or outlet side of the filter 101, most remains plasma is still collected in the bag for plasma extraction by having arranged the bag 106 for plasma extraction in the position lower than the leukocyte removal filter 101. When a plasma constituent passes the leukocyte removal filter 101 on the occasion of plasma skimming, since plasma will carry out priming of the leukocyte removal filter, it is necessary in that case to fully discharge air. It is because the portion which air is overdue in a leukocyte removal filter, and fails to get wet in a filtering medium arises, so performance of a filter can be utilized thoroughly if priming is not performed appropriately.

[0034]Plasma flows from the blood inflow port 6 located in the leukocyte removal filter 101 bottom by arranging in the constituent-of-blood separation method of this invention as the leukocyte removal filter was mentioned above with the hard stand 150, Since the leukopheresis filter member 5 gets wet sequentially from the bottom, in connection with it, air is discharged appropriately, and air is eventually discharged from the

blood outflow port 7 established in the leukocyte removal filter upper part. Thereby, priming of the leukocyte removal filter 101 is performed appropriately. Since the leukocyte removal filter 101 is stored by the hard stand 150 which has the composition mentioned above, The space between the filter member 5 and the sheet 21 made of thermoplastic elasticity resin, and since in other words the capacity of the inflow side blood chamber 3 is regulated, the pressure which the fall of the fluid (filtration materials) of leukocyte removal filter 101 inside is maintained, and stuffs filtration materials into the filtering medium 52 increases, and filtration velocity improves.

[0035]Next, the red corpuscle conservation liquid implantation process which is after a leukocyte-poor plasma extraction process, and pours the red corpuscle conservation liquid in the bag 107 for red corpuscle liquid extraction into the red corpuscle liquid in the bag 105 for whole blood blood collecting in front of a leukocyte-poor red cell liquid extraction process is performed. If the remains plasma in the leukocyte removal filter 101 is collected and the leukocyte removal filter 101 reaches set weight in an example, After the clamp 57 closes and the tube 118 is blockaded, pressure of a pressing mechanism will be canceled automatically and the tube 114 and the tube 117 will be in an opened condition after that. The clamp 56 which blockaded the tube 117 which is open for free passage in the bag 107 for red corpuscle liquid extraction opens wide, and the red corpuscle conservation liquid (MAP) out of the bag 107 for red corpuscle liquid extraction next, via the white blood removal filter 101, Red corpuscle conservation liquid (MAP) is sent into the bag 105 for whole blood blood collecting, and the corpuscle liquid of the bag 105 for whole blood blood collecting is mixed with it. Under the present circumstances, since it can arrange from the higher one in order of the bag 107 for red corpuscle liquid extraction, the leukocyte removal filter 101, and the bag 105 for whole blood blood collecting as shown in drawing 1, It can transport into the bag 105 for whole blood blood collecting, without making the red corpuscle conservation liquid of the bag 107 for red corpuscle liquid extraction almost remain in a leukocyte removal filter. And the bag for plasma extraction which extracted plasma carries out the seal of the tube 118 using a tube sealer, and separates the bag 106 for plasma extraction, and the bag containing plasma derivatives is produced.

[0036]Next, the leukocyte-poor red cell liquid extraction process of passing the leukocyte removal filter 101 and extracting the corpuscle liquid in the bag 105 for whole blood blood collecting in the bag 107 for red corpuscle liquid extraction is performed. In an example, the bag 105 for whole blood blood collecting, the leukocyte removal filter 101, and the bag 107 for red corpuscle liquid extraction are removed from the apheresis system 10, The bag 105 for whole blood blood collecting is hung at a height, the red corpuscle liquid in the bag 105 for whole blood blood collecting is sent to the leukocyte removal filter 101 using a fall, and leukopheresis is performed. Thereby, the white blood cell count of an erythrocyte layer can be removed until it becomes below $1x10^{6}$.

[0037]Since the leukocyte removal filter 101 is stored by the hard stand 150 which has the composition mentioned above, The space between the leukopheresis filter member 5 and the sheet 21 made of thermoplastic elasticity resin, since in other words the capacity of the inflow side blood chamber 3 is regulated, The pressure which the fall of the corpuscle component in the leukocyte removal filter 101 is maintained, and stuffs a corpuscle into the filtering medium 52 can increase, filtration velocity can improve, and it can filter promptly. And after dividing red corpuscle liquid into the bag 107 for red corpuscle liquid

extraction, using the tube sealer, the seal of the tube 117 was carried out, the bag 107 for red corpuscle liquid extraction was separated, and the bag containing MAP ** thick erythrocyte formulation was produced.

[0038]Drawing 9 is an outline view of other constituent-of-blood extraction circuits used for the blood separation device and the blood separation method of this invention. The leukocyte removal filter 130 is a thing of a hard housing type, and the constituent-of-blood extraction circuit 120 of this example is the same as the constituent-of-blood extraction circuit 100 except the connecting tube 103 being provided with the bypass line 133 which bypasses the leukocyte removal filter 130. Hereafter, it explains focusing on a point of difference. The constituent-of-blood extraction circuit 120 of this invention is [the bag 105 for whole blood blood collecting, the bag 106 for plasma extraction the bag 107 for red corpuscle blood collecting, and] from the connecting tube 103, as shown in drawing 9. The tubes 123 and 124 with which the connecting tube 103 connects the leukocyte removal filter 130 and the bag 105 for whole blood blood collecting, The tubes 125, 127, 128, and 129 which branch and connect the leukocyte removal filter 130, the bag 106 for plasma extraction, and the bag 107 for red corpuscle liquid extraction, It has the tees 134 and 135 which connect the bypass line 133 which bypasses the tee 126, and the leukocyte removal filter 130, the blood inflow port 136 and the blood outflow port 137, the bypass line 133, the tubes 123 and 124, and the tubes 125 and 129. What was mentioned above is used for the bag 105 for whole blood blood collecting, the bag 106 for plasma extraction, the bag 107 for red corpuscle liquid extraction, the tubes 123, 124, 125, 127, 128, and 129, the tee 126, and the apheresis system 10.

[0039]The leukocyte removal filter 130 is carrying out the same composition as the leukocyte removal filter 101 except the component of housing. And since it is produced with rigid resin, the outer diameter of housing is not extended even if it dips. The bypass line 133 is produced with the same resin as the tube mentioned above. And the tees 134 and 135 are provided with the check valve (not shown) so that the corpuscle component which has not passed the leukocyte removal filter 130 may not flow into an inside. This regulates circulation of the fluid from the tube 124 side to the tube 133 side, and circulation of the fluid from the tube 133 side to the tube 125 side. since circulation of the fluid of an opposite direction is not regulated, it mentions later -- as -- the air from the bag 106 for plasma extraction -- the tee 135 and the bypass line 133 -- it passes tee 134, and it can be made to be able to pass and can pour into the bag 105 for whole blood blood collecting. A publicly known thing can be used as a check valve, for example, a ball valve type check valve, an umbrella valve type check valve, etc. are preferred.

[0040]Next, the constituent-of-blood separation method of this example is explained. First, the leukocyte-poor plasma extraction process of passing the leukocyte removal filter 130 and extracting the plasma constituent separated in the bag 105 for whole blood blood collecting in the bag 106 for plasma extraction is performed by carrying out centrifugality of the constituent-of-blood extraction circuit 120. Where the blood outflow port 137 side is caudad made into the upper part for the blood inflow port 136 side like the above, the leukocyte removal filter 130 is specifically stored to the hard stand 150, It stores to the stowage 69 of the liquid separation device 55 in which the bag 105 for whole blood blood collecting was formed by the position lower than the leukocyte removal filter 130, and is carried out by installing the bag 106 for plasma extraction in a position lower than the leukocyte removal filter 130. The bag 107 for red corpuscle liquid extraction is hung in a position higher than the leukocyte removal filter 130 using the hook 54a of the jig 54 for immobilization in

which it was provided by the lid 11. A certain amount of quantity of air is beforehand enclosed with the bag 105 for whole blood blood collecting, and the bag 107 for red corpuscle liquid extraction. The tubes 124, 127, and 128 are being fixed to the clamps 58, 56, and 57, respectively.

[0041]In this state, if a separation start switch is pushed, a pressing mechanism will press the bag 105 for whole blood blood collecting, and the top plasma layer in the bag 105 for whole blood blood collecting will be sent out to the bag 106 for plasma extraction. And the air in the filter 130 flows certainly in the bag 106 for plasma extraction in advance of movement of plasma at this time. For this reason, priming which is substitution of the air in a filter and a fluid is performed certainly. And while continuing pressure, when the interface of the plasma layer in a container and a blood cell layer goes up gradually and the fluid detection part 71 detects the interface of corpuscle liquid, the clamp 58 operates and the tube 124 is blockaded. When the tube 124 is blockaded, plasma still remains to the entrance side or outlet side of the filter 130. In order to collect these remains plasma, after loosening pressure of the pressing mechanism of the bag 105 for whole blood blood collecting and canceling the blockade of the tube 124, the bag 106 for plasma extraction is pressed and the air in the bag 106 for plasma extraction is sent into the bag 105 for whole blood blood collecting by bypass-line 133 course. Then, the bag 105 for whole blood blood collecting is pressed again, the air in the bag 105 is sent into the leukocyte removal filter 130, remains plasma is extruded from the inside of the leukocyte removal filter 130, and it collects in the bag 106 for plasma extraction. The tube 124 which is open for free passage in the bag 105 for whole blood blood collecting is automatically blockaded, when the fluid sensor 71 has detected the blood cell layer. That we decided to have the bypass line 133 only in the case of the leukocyte removal filter 130 which has hard housing, Hard housing is because remains plasma is not automatically collected by placing the bag 106 for plasma extraction downward from a leukocyte removal filter as it mentioned above, since volume did not change like elasticity housing.

[0042]Priming can be appropriately carried out with plasma by in the case of this example, turning the blood inflow port 136 down, turning the blood outflow port 137 up, and arranging the leukocyte removal filter 130. Since the leukocyte removal filter 130 is provided with hard housing, it can regulate the capacity of the inflow side blood chamber 3 exactly, and its filtration velocity improves.

[0043]Next, the red corpuscle conservation liquid implantation process which is after a leukocyte-poor plasma extraction process, and pours the red corpuscle conservation liquid in the bag 107 for red corpuscle liquid extraction into the red corpuscle liquid in the bag 105 for whole blood blood collecting in front of a leukocyte-poor red cell liquid extraction process as mentioned above is performed. And using the tube sealer, the bag for plasma extraction which extracted plasma carried out the seal of the tube 128, separated the bag 106 for plasma extraction, and produced the bag containing plasma derivatives. Next, the leukocyte-poor red cell liquid extraction process of passing the leukocyte removal filter 130 and extracting the corpuscle liquid in the bag 105 for whole blood blood collecting in the bag 107 for red corpuscle liquid extraction is performed. In this example, the bag 105 for whole blood blood collecting, the leukocyte removal filter 130, and the bag 107 for red corpuscle liquid extraction are removed from the apheresis system 10, The bag 105 for whole blood blood collecting is hung at a height, the red corpuscle liquid in the bag 105 for whole blood blood collecting is sent to the leukocyte removal filter 130 using a fall, and leukopheresis is performed. Under the present circumstances, since the red corpuscles containing red corpuscle conservation liquid remain an entrance and

near an exit the leukocyte removal filter 130, After sending in the air in the bag 107 for red corpuscle liquid extraction in the bag 105 for whole blood blood collecting via the bypass line 133, the bag 105 for whole blood blood collecting is pressed again, remains red corpuscle liquid is extruded from the inside of the leukocyte removal filter 130, and it collects in the bag 107 for red corpuscle liquid extraction. After filtering red corpuscle liquid, using the tube sealer, the seal of the tube 127 was carried out, the bag 107 for red corpuscle liquid extraction was separated, and the bag containing MAP ** thick erythrocyte formulation was produced.

[0044]Next, the constituent-of-blood extraction circuit of other examples used for the blood separation device and the blood separation method of this invention is explained using a drawing. Drawing 10 is an outline view of the constituent-of-blood extraction circuit of other examples used for the blood separation device and the blood separation method of this invention. Drawing 2 is a perspective view in the state where the apheresis system of this invention was equipped with this constituent-of-blood extraction circuit. The bag 105 for whole blood blood collecting, the bag 106 for plasma extraction, the bag 107 for red corpuscle liquid extraction in which it filled up with red corpuscle conservation liquid, and the constituent-of-blood extraction circuit 140 provided with the leukocyte removal filter 101 at least are used for the constituent-of-blood separation method of this example. And a constituent-of-blood separation method is provided with the following.

The centrifugal process of carrying out centrifugality of the constituent-of-blood extraction circuit after extracting whole blood in the bag 105 for whole blood blood collecting.

The plasma extraction process of extracting the plasma constituent separated in the bag 105 for whole blood blood collecting by the centrifugal process in the bag 106 for plasma extraction.

The red corpuscle conservation liquid implantation process which pours the red corpuscle conservation liquid in the bag 107 for red corpuscle liquid extraction into the red corpuscle liquid in the bag 105 for whole blood blood collecting after a plasma extraction process.

The red corpuscle conservation liquid addition leukocyte-poor red cell liquid extraction process of passing the leukocyte removal filter 101 and extracting the red corpuscle conservation liquid addition corpuscle liquid in the bag 105 for whole blood blood collecting in the bag 105 for red corpuscle liquid extraction.

[0045]As shown in drawing 10, the constituent-of-blood extraction circuit 140 is provided with the following.

The bag 105 for whole blood blood collecting.

The bag 106 for plasma extraction.

The bag 107 for red corpuscle liquid extraction filled up with red corpuscle conservation liquid.

It has the tee 146 which branched to two forks while the end was connected to the bag 105 for whole blood blood collecting, And the connecting tube 141 by which the branched one end was connected to the bag 106 for plasma extraction, and the branched another side end was connected to the bag 107 for red corpuscle liquid extraction and the leukocyte removal filter 101 arranged between the tee 146 of the connecting tube 141, and the bag 107 for red corpuscle liquid extraction.

And the connecting tube 141 consists of the tubes 144, 145, 147, and 148 and the tee 146. The apheresis system 30 is equipped with the constituent-of-blood extraction circuit 140 as shown in drawing 2. And what was mentioned above is used as the bag 105 for whole blood blood collecting, the leukocyte removal filter 101, the bag 106 for plasma extraction, the tubes 144, 145, 147, and 148, the tee 146, and the apheresis

system 10.

[0046]Next, the constituent-of-blood separation method performed using the constituent-of-blood extraction circuit 140 of this invention is explained. First, like the case of the constituent-of-blood extraction circuit 100, after collecting blood in the bag 105 for whole blood blood collecting, the process of carrying out centrifugality of it is performed. Next, the plasma extraction process of extracting the plasma constituent separated in the bag 105 for whole blood blood collecting by the centrifugal process in the bag 106 for plasma extraction is performed. Where the blood outflow port 7 side is made into a lower part for the blood inflow port 6 side in the upper part, the leukocyte removal filter 101 is specifically stored to the hard stand 150, The bag 105 for whole blood blood collecting is stored to the stowage 69 of the liquid separation device 55 in which it was provided by the position lower than the leukocyte removal filter 101, The bag 106 for plasma extraction and the bag 107 for red corpuscle extraction are hung in a position higher than the leukocyte removal filter 101 using the hook 54a of the jig 54 for immobilization in which it was provided by the lid 11. The tubes 144, 147, and 148 are being fixed to the clamps 56, 58, and 57, respectively.

[0047]If a separation start switch is pushed like the above in this state, the clamps 56, 57, and 58 will close by a solenoid, and the tubes 144, 147, and 148 will be in a state of obstruction. In this stage, the communicating member 110 which is provided in the tube 147 and which can be fractured, and the communicating member 111 which is provided in the tube 144 and which can be fractured are fractured. And again, if the separation start switch of the apheresis system 10 is pushed, The tube 144 will be in a state of obstruction, the tubes 147 and 148 will be in an opened condition, a pressing mechanism presses the bag 105 for whole blood blood collecting, and the top plasma layer in the bag 105 for whole blood blood collecting is sent out to the bag 106 for plasma extraction. And the tube 147 is blockaded, when the interface of the plasma layer in a container and a blood cell layer goes up gradually and the fluid detection part 71 has detected the interface of corpuscle liquid, while continuing pressure.

[0048]Next, the red corpuscle conservation liquid implantation process which pours the red corpuscle conservation liquid in the bag 107 for red corpuscle liquid extraction into the red corpuscle liquid in the bag 105 for whole blood blood collecting is performed. After the clamp 57 specifically closes automatically and the tube 148 is blockaded, The state of obstruction of pressure and the tube 147 of a pressing mechanism, and the tube 144 is canceled, and via the white blood removal filter 101, the red corpuscle conservation liquid in the bag 107 for red corpuscle liquid extraction flows in in the bag 105 for whole blood blood collecting, and is mixed with red corpuscles. Like this invention, when a plasma constituent does not pass a leukocyte removal filter on the occasion of plasma skimming, since red corpuscle conservation liquid will carry out priming of the leukocyte removal filter, it is necessary [it] in that case to fully discharge air. It is because the portion which air is overdue in a leukocyte removal filter, and fails to get wet in a filtering medium arises, so performance of a filter can be utilized thoroughly if priming is not performed appropriately.

[0049]Red corpuscle conservation liquid flows from the blood outflow port 7 located in the leukocyte removal filter 101 bottom by arranging in the constituent-of-blood separation method of this invention as the leukocyte removal filter 101 was mentioned above, Since the leukopheresis filter member gets wet sequentially from the bottom, in connection with it, air is discharged appropriately, and, finally air is discharged from the blood inflow port 6 established in the leukocyte removal filter upper part. Thereby, priming of the leukocyte removal

filter 101 is performed appropriately. Since the leukocyte removal filter 101 is stored by the hard stand 150 which has the composition mentioned above, The space between the leukopheresis filter member 5 and the sheet 21 made of thermoplastic elasticity resin, since in other words the capacity of the inflow side blood chamber 3 is regulated, The pressure which the fall of the fluid (filtration materials) of leukocyte removal filter 101 inside is maintained, and stuffs filtration materials into the filtering medium 52 increases, and filtration velocity improves. Since it can arrange from the higher one in order of the bag 107 for red corpuscle liquid extraction, the leukocyte removal filter 101, and the bag 105 for whole blood blood collecting as shown in drawing 2, It can transport into the bag 105 for whole blood blood collecting, without making the red corpuscle conservation liquid of the bag 107 for red corpuscle liquid extraction almost remain in a leukocyte removal filter. And using the tube sealer, the seal of the tube 148 was carried out, the bag 106 for plasma extraction was separated, and the bag containing plasma derivatives was produced.

[0050]Next, the leukocyte-poor red cell liquid extraction process of passing the leukocyte removal filter 101 and extracting the corpuscle liquid in the bag 105 for whole blood blood collecting in the bag 107 for red corpuscle liquid extraction is performed. In this example, the bag 105 for whole blood blood collecting, the leukocyte removal filter 101, and the bag 107 for red corpuscle liquid extraction are removed from the apheresis system 10, The bag 105 for whole blood blood collecting is hung at a height, the red corpuscle liquid in the bag 105 for whole blood blood collecting is sent to the leukocyte removal filter 101 using a fall, and leukopheresis is performed. Thereby, the white blood cell count of an erythrocyte layer can be removed until it becomes below $1x10^{6}$.

[0051]And after dividing red corpuscle liquid into the bag 107 for red corpuscle liquid extraction, using the tube sealer, the seal of the tube 144 was carried out, the bag 107 for red corpuscle liquid extraction was separated, and the MAP ** thick erythrocyte formulation bag was produced. The constituent-of-blood extraction circuit of other examples used for the blood separation device and the blood separation method of this invention is explained using a drawing. Drawing 11 is an outline view of the constituent-of-blood extraction circuit of other examples used for the blood separation device and the blood separation method of this invention. The constituent-of-blood extraction circuit 150 used for the constituent-of-blood separation method of this example, The leukocyte removal filter 130 is a thing of a hard housing type, and the connecting tube is the same as that of the constituent-of-blood extraction circuit 140 except having the bypass line 173 which bypasses the leukocyte removal filter 130. Hereafter, it explains focusing on a point of difference.

[0052]The constituent-of-blood extraction circuit 150 of this invention serves as the bag 105 for whole blood blood collecting, the bag 106 for plasma extraction, and the bag 107 for red corpuscle liquid extraction from the connecting tube 170, as shown in drawing 11. The tubes 175, 177, 178, and 179 and the tee 176 with which the connecting tube 170 branches and connects the leukocyte removal filter 130, the leukocyte removal filter 130, the bag 105 for whole blood blood collecting, and the bag 106 for plasma extraction, The tubes 172 and 174 which connect the leukocyte removal filter 130 and the bag 107 for red corpuscle liquid extraction, It consists of the bypass line 173 which bypasses the blood inflow port 136 and the blood outflow port 137, and the tees 184 and 185 which connect the bypass line 173, the tubes 172 and 174, and 175 and 179. And the leukocyte removal filter 130 and the bag 105 for whole blood blood collecting, What was mentioned above is used for the bag 106 for plasma extraction, the bag 107 for red corpuscle liquid extraction, the tubes 172,

174, 175, 177, 178, and 179, the tee 176, the tee 184, the tee 185, and the apheresis system 10. The bypass line 173 and the tees 184 and 185 are produced like the bypass line 133 and the tees 134 and 135, and the check valve (not shown) is attached to the tees 184 and 185 so that the blood which has not passed the leukocyte removal filter 130 may not flow. Rigid resin, such as polycarbonate, is used as housing of the leukocyte removal filter 130. The structure of others of a leukocyte removal filter is as having mentioned above.

[0053]Next, the constituent-of-blood separation method performed using the constituent-of-blood extraction circuit 150 of this invention is explained. First, like the case of the constituent-of-blood extraction circuit 100, after collecting blood in the bag 105 for whole blood blood collecting, the process of carrying out centrifugality of it is performed. Thus, since the boundary of a top plasma layer and a lower plasma layer becomes clear on the basis of a buffy coat layer by carrying out centrifugality before constituent-of-blood separation, when separating a plasma layer, mixing of red corpuscles can be suppressed in a minute amount. Next, the plasma extraction process of extracting the plasma constituent separated in the bag 105 for whole blood blood collecting by the centrifugal process in the bag 106 for plasma extraction is performed.

[0054]Where the blood outflow port 137 side is made into a lower part for the blood inflow port 136 side in the upper part, the leukocyte removal filter 130 is specifically stored to the hard stand 150, The bag 105 for whole blood blood collecting is stored to the stowage 69 of the liquid separation device 55 in which it was provided by the position lower than the leukocyte removal filter 130, The bag 106 for plasma extraction and the bag 107 for red corpuscle extraction are hung in a position higher than the leukocyte removal filter 130 using the hook 54a of the jig 54 for immobilization in which it was provided by the lid 11. The tubes 177, 174, and 178 are being fixed to the clamps 58, 56, and 57, respectively. If a separation start switch is pushed like the above in this state, the clamps 56, 57, and 58 will close by a solenoid, and the tubes 174, 177, and 178 will be in a state of obstruction. In this stage, the communicating member 110 which is provided in the tube 177 and which can be fractured, and the communicating member 111 which is provided in the tube 174 and which can be fractured are fractured. And again, if the separation start switch of the apheresis system 10 is pushed, In the tube 174, a state of obstruction and the tubes 177 and 178 will be in an opened condition by a solenoid, a pressing mechanism presses the bag 105 for whole blood blood collecting, and the top plasma layer in the bag 105 for whole blood blood collecting is sent out to the bag 106 for plasma extraction. And while continuing pressure, if the interface of the plasma layer in a container and a blood cell layer goes up gradually and the fluid detection part 71 detects the interface of corpuscle liquid, the tube 177 will be blockaded by the clamp 58 and almost all plasma constituents will be transported into the bag 106 for plasma extraction after a while.

[0055]Next, the red corpuscle conservation liquid implantation process which pours the red corpuscle conservation liquid in the bag 107 for red corpuscle liquid extraction into the red corpuscle liquid in the bag 105 for whole blood blood collecting is performed. Pressure of a pressing mechanism is canceled, and it is in the state which opened the tubes 174 and 177 wide, red corpuscle conservation liquid (MAP) is sent in in the bag 105 for whole blood blood collecting via the white blood removal filter 130 from the inside of the bag 107 for red corpuscle liquid extraction, and, specifically, it mixes with red corpuscles. under the present circumstances -- from [having arranged the leukocyte removal filter 130 to the hard stand 150, as mentioned

above] -- suitable -- priming -- and it can filter promptly. And using the tube sealer, the seal of the tube 178 was carried out, the bag 106 for plasma extraction was separated, and the bag containing plasma derivatives was produced.

[0056]Next, the leukocyte-poor red cell liquid extraction process of passing the leukocyte removal filter 130 and extracting the corpuscle liquid in the bag 105 for whole blood blood collecting in the bag 107 for red corpuscle liquid extraction is performed. In an example, the bag 105 for whole blood blood collecting, the leukocyte removal filter 130, and the bag 107 for red corpuscle liquid extraction are removed from the apheresis system 10, The bag 105 for whole blood blood collecting is hung at a height, the red corpuscle liquid in the bag 105 for whole blood blood collecting is sent to the leukocyte removal filter 130 using a fall, and leukopheresis is performed. When filtration is stopped, red corpuscle liquid remains to the entrance side or outlet side of a filter. In order to collect these remains red corpuscle liquid, after making the tube 173 blockade, pressing the bag 107 for red corpuscle liquid extraction and sending the air in the bag 107 for red corpuscle liquid extraction into the bag 105 for whole blood blood collecting by bypass-line 173 course, It is made to flow down remains red corpuscle liquid from the inside of waiting and the leukocyte removal filter 130 for a while, and collects in the bag 107. Thereby, the white blood cell count in corpuscle liquid can be removed until it becomes below $1x10^{6}$.

[0057]And after dividing red corpuscle liquid into the bag 107 for red corpuscle liquid extraction, using the tube sealer, the seal of the tube 174 was carried out, the bag 107 for red corpuscle liquid extraction was separated, and it produced entering a MAP ** thick erythrocyte formulation bag. It is not that to which the bag for whole blood blood collecting, the bag for plasma extraction, the bag for red corpuscle liquid extraction, the leukocyte removal filter, etc. were thoroughly connected by the tube as a circuit in all the constituent-of-blood extraction circuits mentioned above, In other words, one place or two or more places may be the things of the type which is not connected beforehand but connects by using an abacterial joining apparatus just before use about the part.

[0058](Experiment 1)

(Example 1) It was shown in drawing 8 and the constituent-of-blood extraction circuit of composition of having mentioned above was used. It centrifuged, after extracting 400 ml of whole blood in the bag for the product whole blood blood collecting made of soft polyvinylchloride resin. Then, the elasticity leukocyte removal filter was passed for the plasma constituent separated in the bag for whole blood blood collecting, and plasma was extracted in the bag for plasma extraction. And the red corpuscle conservation liquid in the bag for red corpuscle liquid extraction was poured into the red corpuscle liquid in the bag for whole blood blood collecting. And the elasticity leukocyte removal filter was passed for the red corpuscle conservation liquid addition red corpuscle liquid in the bag for whole blood blood collecting, and red corpuscle liquid was extracted in the bag for red corpuscle liquid extraction.

[0059]As an elasticity leukocyte removal filter, as a housing formation member, the elasticity poly chloridation vinyl sheet which serves as a satin surface at 110 mm in length, 75 mm in width, and 0.4 mm in thickness so that it may become the blood inflow side, The elasticity poly chloridation vinyl sheet in which the rib from which a section is set to 0.8 mm in height at 110 mm in length, 75 mm in width, and 0.4 mm in thickness, and serves as about 3 square shapes with the distance across vee of 1 mm in one field was formed in the length

direction at intervals of 2 mm was used so that it might become the blood outflow side. As a blood inflow port and a blood outflow port, the tube made from soft polyvinyl chloride (23 mm in length, 4 mm in inside diameter, outer diameter of 6 mm) by which injection molding was carried out was used. As a filtering medium for leukopheresis, six things which pierced the polyurethane porous body (about 1 mm in thickness, 5 micrometers of average pore sizes, about 85 mm in length, and about 65 mm in width) in the shape of an ellipse were laminated, and it produced by heat sealing the periphery. The thickness of 1 mm and a non seal part of this filtering medium for leukopheresis is [the thickness of the peripheral sealed part] about 10 mm. A sheet-shaped frame (110 mm in length, the breadth of 75 mm, the frame width of 10-25 mm, and 0.4 mm in thickness), The sheet produced using the resin which mixes polyurethane resin and polyvinyl chloride resin at a rate of 1:1 is formed, it is produced, and the inside scooping out part of the film is produced somewhat smaller than said filtering medium. And the filter member for leukopheresis applies a sheet-shaped frame to the filtering medium for leukopheresis, and is produced by carrying out external hot welding of the whole periphery of the outside of the filtering medium for leukopheresis, and the whole periphery of the inside of a sheet-shaped frame.

[0060]And turn the blood inflow side elasticity poly chloridation vinyl sheet down, and the filter member for leukopheresis by which the filtering medium was welded on this is carried, The tube made from soft polyvinyl chloride has been arranged between the section extending by the side of the upper bed of the sheet-shaped frame of the filter member for leukopheresis, and the above-mentioned blood inflow side elasticity poly chloridation vinyl sheet. Then, the blood outflow side elasticity poly chloridation vinyl sheet is carried so that a rib forming face may lap on the filter member for leukopheresis, Between the section extending by the side of the lower end of the sheet-shaped frame of the filter member for leukopheresis, and the above-mentioned blood outflow side elasticity poly chloridation vinyl sheet, the tube made from soft polyvinyl chloride has been arranged, and thermal melting arrival of these edge parts was carried out by the high frequency welder. Finally, the excessive portion was cut by punching metal fittings, and the leukopheresis machine of this invention was produced.

[0061]Whole blood was collected blood in the bag for whole blood blood collecting. After carrying out centrifugality, the bag for whole blood blood collecting is pressed, and plasma is transported to the bag for plasma extraction via a leukocyte removal filter. At this time, the bag for plasma extraction was made into the lower part rather than the filter. By pressing the bag for whole blood blood collecting, plasma flows into a filter and the filtered plasma is transported to the bag for plasma extraction. While continuing the press of the bag for whole blood blood collecting, the interface of the plasma layer in a bag and an erythrocyte layer goes up gradually, but a press is suspended when an interface arrives at a prescribed position. When the press was suspended, plasma still remained to the entrance side or outlet side of the filter, but most of this remains plasma was soon collected altogether by the bag for plasma extraction by the effect of having made the bag for plasma extraction into the lower part rather than the filter. At this time, the filter stand was used and air discharge in a filter was fully performed by that the direction of filter wearing was suitable. The seal cut of the tube attached to the bag for plasma extraction was carried out, and it was considered as the bag containing plasma derivatives. The content fluid of the bag for red corpuscle liquid extraction is transported to the bag for whole blood blood collecting via a filter by making the bag for red corpuscle liquid extraction into the upper

part. At this time, the stand for filters was used, and the transfer in the bag for whole blood blood collecting was fully able to be performed according to the fall having been suitable, without making the content fluid of the bag for red corpuscle liquid extraction remain too much to a filter. The red corpuscles in the bag for whole blood blood collecting which added the content fluid of the bag for red corpuscle liquid extraction were mixed, and hemofiltration was performed by making the bag for whole blood blood collecting into the upper part. When filtration was completed, the seal of the tube which connects between filters with the bag for red corpuscle liquid extraction was carried out, and it was considered as the bag containing MAP ** thick erythrocyte formulation. By operating it using this stand for filters, addition of the MAP liquid to the air discharge and packed red blood cells from a filter was able to be ensured without special operation.

[0062](Example 2) Except that the position of a leukocyte removal filter showed drawing 10, the same constituent-of-blood extraction circuit as Example 1 was used. Whole blood was collected blood in the bag for whole blood blood collecting. After carrying out centrifugality, the bag for whole blood blood collecting was pressed, and plasma was transported to the bag for plasma extraction. The seal cut of the tube attached to the bag for plasma extraction was carried out, and it was considered as the bag containing plasma derivatives. The content fluid of the bag for red corpuscle liquid extraction was transported to the bag for whole blood blood collecting by making the bag for red corpuscle liquid extraction into the upper part. At this time, the stand for filters was used, and the transfer in the bag for whole blood blood collecting was fully able to be performed according to the fall having been suitable, without making the content fluid of the bag for red corpuscle liquid extraction remain too much in a filter. The red corpuscles in the bag for whole blood blood collecting which added the content fluid of the bag for red corpuscle liquid extraction were mixed, and hemofiltration was performed by making the bag for whole blood blood collecting into the upper part. When filtration was completed, the seal of the tube which connects a filter with the bag for red corpuscle liquid extraction was carried out, and it was considered as the bag containing MAP ** thick erythrocyte formulation.

[0063](Example 3) It was shown in drawing 9 and the constituent-of-blood extraction circuit of composition of having mentioned above was used. As a hard leukocyte removal filter, the container made from polycarbonate (95 mm in length, 70 mm in width, and 13 mm in thickness) was used as a housing formation member. As a blood inflow port and a blood outflow port, the tube made from soft polyvinyl chloride (23 mm in length, 4 mm in inside diameter, outer diameter of 6 mm) by which injection molding was carried out was used. As a filtering medium for leukopheresis, six things which pierced the polyester nonwoven fabric (about 1 mm in thickness, the fiber diameter of 5 micrometers, about 85 mm in length, and about 65 mm in width) in the shape of an ellipse were laminated, and it produced by heat sealing the periphery. The thickness of 1 mm and a non seal part of this filtering medium for leukopheresis is [the thickness of the peripheral sealed part] about 10 mm. It was filled up with this in the above-mentioned housing. This bag for red corpuscle liquid extraction is beforehand filled up with 15-30 ml of air other than MAP liquid. The check valve is provided in the bypass line and the blood which has not passed the filter by the effect is prevented from flowing into the filter lower part.

[0064]Whole blood was collected blood in the bag for whole blood blood collecting. After carrying out centrifugality, the bag for whole blood blood collecting was pressed, and plasma was transported to the bag for plasma extraction via the filter. Although plasma flows into a filter by pressing the bag for whole blood

blood collecting, since the housing of a filter is hard, plasma passes a filter one by one. While continuing the press of the bag for whole blood blood collecting, the interface of the plasma layer in a bag and an erythrocyte layer went up gradually, but the press was suspended when the interface arrived at the prescribed position. At this time, the stand for filters was used and air discharge in a filter was fully performed by that the direction of filter wearing was suitable. On the other hand, when a press is suspended, plasma remains in the dead space of the entrance side of housing, and an outlet side. In order to collect these remains plasma, after blockading the tube between a filter outlet side blood outflow port and a tube tee, The air which loosened the press of the bag for whole blood blood collecting, pressed the bag for plasma extraction, and was stored by the bag for plasma extraction is sent to the bag for whole blood blood collecting via a bypass line, and it waits for it for a while. Soon, the whole of this remains plasma was collected by the bag for plasma extraction. The seal cut of the tube attached to the bag for plasma extraction was carried out, and it was considered as the bag containing plasma derivatives. The content fluid of the bag for red corpuscle liquid extraction was transported to the bag for whole blood blood collecting via the filter by making the bag for red corpuscle liquid extraction into the upper part. At this time, the stand for filters was used, and the transfer in the bag for whole blood blood collecting was fully able to be performed according to the fall having been suitable, without making the content fluid of the bag for red corpuscle liquid extraction remain too much in a filter. The red corpuscles in the bag for whole blood blood collecting which added the content fluid of the bag for red corpuscle liquid extraction were mixed, the upper part and the bag for red corpuscle liquid extraction were made into the lower part for the bag for whole blood blood collecting, and hemofiltration was performed. After blockading the tube between a filter outlet side blood outflow port and a tube tee, the air in the bag for red corpuscle liquid extraction was sent to the bag for whole blood blood collecting via the bypass line, and hemofiltration was continued where the upper part and the bag for red corpuscle liquid extraction are made into a lower part for the bag for whole blood blood collecting. When filtration was completed, the seal of the tube which connects between filters with the bag for red corpuscle liquid extraction was carried out, and it was considered as the bag containing MAP ** thick erythrocyte formulation.

[0065](Example 4) Except that the position of a leukocyte removal filter showed drawing 11, the same constituent-of-blood extraction circuit as Example 3 was used. This bag for red corpuscle liquid extraction is beforehand filled up with 15-30 ml of air other than MAP liquid. The check valve is provided in the bypass line and the blood which has not passed the filter by the effect is prevented from flowing into the filter lower part. Whole blood was collected blood in the bag for whole blood blood collecting. After centrifugality, the bag for whole blood blood collecting was pressed, and plasma was transported to the bag for plasma extraction. The seal cut of the tube attached to the bag for plasma extraction was carried out, and it was considered as the bag containing plasma derivatives. The content fluid of the bag for red corpuscle liquid extraction was transported to the bag for whole blood blood collecting by making the bag for red corpuscle liquid extraction into the upper part. At this time, the stand for filters was used, and the transfer in the bag for whole blood blood collecting was fully able to be performed according to the fall having been suitable, without making the content fluid of the bag for red corpuscle liquid extraction remain too much in a filter. The red corpuscles in the bag for whole blood blood collecting which added the content fluid of the bag for red corpuscle liquid extraction were mixed, the upper part and the bag for red corpuscle liquid extraction were made into the lower

part for the bag for whole blood blood collecting, and hemofiltration was performed. After blockading the tube between a filter outlet side blood outflow port and a tube tee, the air in the bag for red corpuscle liquid extraction was sent to the bag for whole blood blood collecting via the bypass line, and hemofiltration was continued where the upper part and the bag for red corpuscle liquid extraction are made into a lower part for the bag for whole blood blood collecting. When filtration was completed, the seal of the tube which connects a filter with the bag for red corpuscle liquid extraction was carried out, and it was considered as the bag containing MAP ** thick erythrocyte formulation.

[0066](Comparative example 1) The same constituent-of-blood extraction circuit as Example 1 was used. The difference with Example 1 is only not having used a filter stand, but the worker's having held the filter by hand, and having performed MAP liquid addition to the same blood separation and packed red blood cells as Example 1.

[0067](Comparative example 2) The same constituent-of-blood extraction circuit as Example 2 was used. The difference with Example 2 is only not having used a filter stand, but the worker's having held the filter by hand, and having performed MAP liquid addition to the same blood separation and packed red blood cells as Example 2.

[0068](Comparative example 3) The same constituent-of-blood extraction circuit as Example 3 was used. It is only the difference with Example 3 not having used a filter stand, but the worker's having held the filter by hand, and having performed MAP liquid addition to the same blood separation and packed red blood cells as Example 3.

[0069](Comparative example 4) The same constituent-of-blood extraction circuit as Example 4 was used. It is only the difference with Example 4 not having used a filter stand, but the worker's having held the filter by hand, and having performed MAP liquid addition to the same blood separation and packed red blood cells as Example 4.

[0070](Comparative example 5) The same constituent-of-blood extraction circuit as Example 1 was used. It is only the difference with Example 1 not having used a filter stand, and not having performed special maintenance all of the filter further.

[0071](Comparative example 6) The same constituent-of-blood extraction circuit as Example 2 was used. It is only the difference with Example 2 not having used a filter stand, and not having performed special maintenance all of the filter further.

[0072](Comparative example 7) The same constituent-of-blood extraction circuit as Example 3 was used. It is only the difference with Example 3 not having used a filter stand, and not having performed special maintenance all of the filter further.

[0073](Comparative example 8) The same constituent-of-blood extraction circuit as Example 4 was used. It is only the difference with Example 4 not having used a filter stand, and not having performed special maintenance all of the filter further. It was made for Examples 1-4 and the comparative examples 1-8 to be set to 400 ml as for the amount of net (except for anticoagulant) blood collecting. The result related with the workability and MAP ******** filtration in each is shown in Table 1.

[0074]

[Table 1]

	作業性評価	MAP加赤血球濾過時間(分)		赤血球回収率(%)		白血球除去性能(-LOG10)	
実施例1	○	25±6	○	89±1	○	4.2±0.4	○
実施例2	○	26±7	○	90±2	○	4.1±0.5	○
実施例3	○	22±5	○	89±1	○	4.0±0.5	○
実施例4	○	21±6	○	90±1	○	4.1±0.5	○
比較例1	×	26±6	○	89±1	○	4.2±2.8	○
比較例2	×	27±7	○	90±2	○	4.0±0.4	○
比較例3	×	21±6	○	88±2	○	4.0±0.6	○
比較例4	×	21±7	○	89±3	○	4.2±0.5	○
比較例5	○	46±28	×	75±12	×	2.1±0.9	×
比較例6	○	47±21	×	76±10	×	2.3±1.1	×
比較例7	○	41±38	×	71±18	×	2.2±1.2	×
比較例8	○	40±38	×	70±17	×	2.1±1.3	×

O in front: Fitness and poor x: (every n=3; average value ** standard deviation)

[0075]sysmex XE2000 performed the count of each blood count, and also it carried out by the NAJIETTO method about the white blood cell count of 10^6 level. The rate of leukopheresis was based on the following formulas.

The rate of leukopheresis = $-\log_{10}$ (an after-filtration white blood cell count / front [filtration] white blood cell count)

The filtration time of Examples 3 and 4, the comparative examples 3 and 4, and the comparative examples 7 and 8 also includes the blood recovery time using a bypass line.

[0076]In the comparative examples 1-4, workability was not good. It was dramatically complicated to have performed other operations, holding especially a filter. On the other hand, since it was not necessary to hold a filter in Examples 1-4, workability was good. In the comparative examples 5-8, since special time and effort was not applied for positioning of a filter, the problem in the point of workability was not produced. Since there was a case where the comparative examples 5-8 were not enough as dilution of packed red blood cells with MAP liquid, the viscosity of the blood filtered became height and became longer [filtration time] than Examples 1-4 as a result. Since there was a case where the comparative examples 5-8 were not enough as dilution of packed red blood cells with MAP liquid, the hematocrit of the blood filtered became height, the amount of [which remains to the filtering medium of a filter as a result] red corpuscle loss became more than Examples 1-4, and variation was also large. That is, in the comparative examples 5-8, the red corpuscle recovery rate of variation was low large. In the comparative examples 5-8, the rate of leukopheresis of variation was large at slight lowness. It guessed because there was a case where priming was not enough.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]Drawing 1 is a perspective view of the apheresis system used for the constituent-of-blood separation method of this invention.
[Drawing 2]Drawing 2 is a perspective view of the apheresis system used for the constituent-of-blood separation method of this invention.
[Drawing 3]Drawing 3 is an enlarged drawing of the example of the stand used for the constituent-of-blood segregating unit of drawing 1.
[Drawing 4]Drawing 4 is an enlarged drawing of other examples of the stand used for the constituent-of-blood segregating unit of this invention.
[Drawing 5]Drawing 5 is an explanatory view of the example of the liquid separation device used for the apheresis system of this invention.
[Drawing 6]Drawing 6 is an explanatory view explaining an operation of the liquid separation device of drawing 5.
[Drawing 7]Drawing 7 is an explanatory view explaining an operation of the liquid separation device of drawing 5.
[Drawing 8]Drawing 8 is an outline view of the constituent-of-blood extraction circuit used for the apheresis system of the example of this invention.
[Drawing 9]Drawing 9 is an outline view of an example of the constituent-of-blood extraction circuit used for the apheresis system of this invention.
[Drawing 10]Drawing 10 is an outline view of an example of the constituent-of-blood extraction circuit used for the apheresis system of this invention.
[Drawing 11]Drawing 11 is an outline view of an example of the constituent-of-blood extraction circuit used for the apheresis system of this invention.
[Drawing 12]Drawing 12 is the front view seen from the outflow side blood chamber side of the leukocyte removal filter used for the constituent-of-blood extraction circuit of this invention.
[Drawing 13]Drawing 13 is a rear elevation of the leukocyte removal filter of drawing 12.
[Drawing 14]Drawing 14 is an A-A line expanded sectional view of the leukocyte removal filter of drawing 12.
[Drawing 15]Drawing 15 is a B-B line sectional view of the leukocyte removal filter of drawing 12.

[Description of Notations]

10 Apheresis system

100, 120, 140, and 170 Constituent-of-blood extraction circuit

101, 130 leukocyte removal filters

105 The bag for whole blood blood collecting

106 The bag for plasma extraction

107 The bag for red corpuscle liquid extraction

[Translation done.]